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Influence of surface-active compounds on the response and sensitivity of cholinesterase biosensors for inhibitor determination

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Abstract

The influence of non-ionogenic surfactants, i.e., Tween-20, Triton X-100 and PEG-10,000, on the response of cholinesterase-based potentiometric biosensors and their sensitivity towards reversible and irreversible inhibitors were investigated. Acetyl-and butyrylcholinesterases were immobilized on nylon, cellulose nitrate films and tracing paper and were introduced into an assembly of potentiometric biosensors. The effect of surface-active compounds depends on the hydrophilic properties and porosity of the enzyme support material and the inhibition mechanism. In the range 0.002-0.3% m/v the surfactants show a reversible inhibiting effect on biosensor response. At tower concentrations (down to 10-4% m/v) the surfactants alter the analytical characteristics of reversible and irreversible inhibitor determination. The use of surface-active additives improves the biosensor selectivity in multi-component media.

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Keywords

Cholinesterase biosensor, Inhibitor determination, Non-ionogenic surfactants